JOANLAB®

DIGITAL DISPLAY MAGRETIC STIRRER WITH HOTPLATE

User's Manual

HSC-19T Digital Ceramic Magnetic Stirrer With Hot Plate

★ Please read the User Manual carefully before using, and follow all operating and safety instructions!

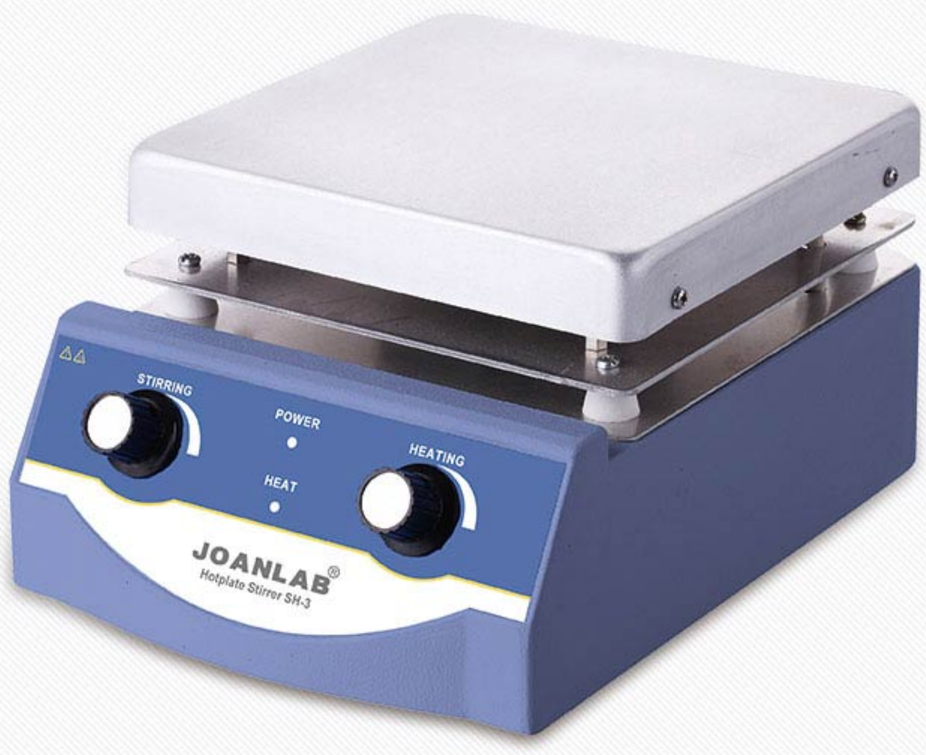
Ningbo JOAN LAB Equipment Co.,Ltd

DIGITAL DISPLAY MAGRETIC STIRRER WITH HOTPLATE

HIGH QUALITY SPECIAL FOR YOU

HSC-19T Hotplate Stirrer With Digital Display

HS-19 Hotplate Stirrer



HS-17 Hotplate Stirrer

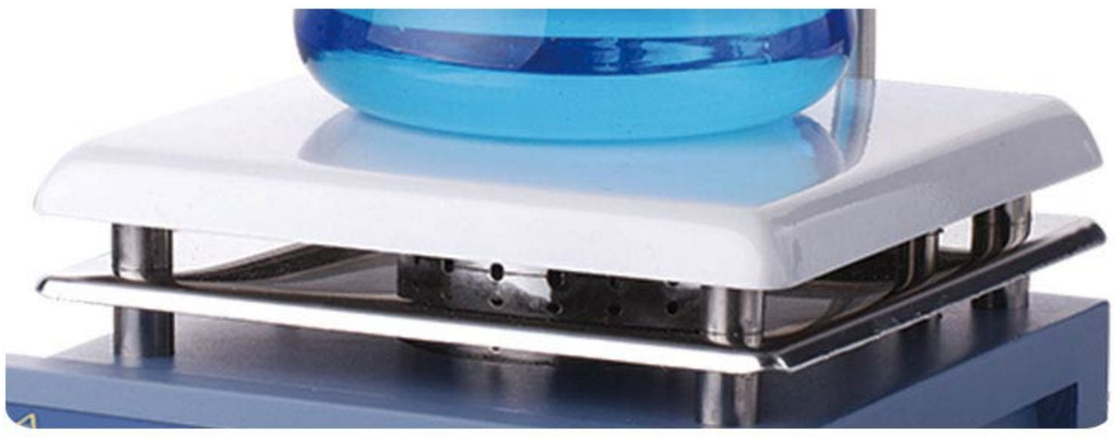
HS-12 Hotplate Stirrer

I. Introduction

A magnetic stirrer is a laboratory instrument used for mixing liquids. It is mainly used for stirring,or heating and stirring stirring low viscosity liquid or solid liquid mixture at the same time,. Its basic principle is repulsion and attraction of magnetic, using magnetic field to push the magnetic stirring bar in the container to perform circumferential operation, so as to achieve the purpose of mixing liquid. With the heating temperature control system, it can heating and control the samples temperature according to the specific experimental requirements, maintaining the temperature for the experimental conditions, ensuring that liquid mixing to meet the experimental requirements.

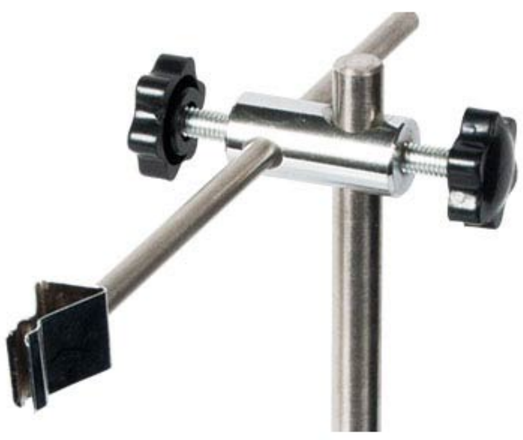
II. Features

1. HSC-19 with ceramic coating Aluminum alloy working plate: attractive, uniform thermal conduction, high temperature resistance and corrosion resistance. the Max temperature 350℃, accuracy(+-1℃).



2. LCD display: it makes reading clear and intuitive, displaying temperature and revolution, having timing function,and can control temperature and revolution accurately.

3. With temperature sensor,monitoring and controling sample's temperature in real time.



4. The adjustable sensor fixing bracket: it makes sensor monitoring and controlling more convenient.

5. Waterproof soft touch button, feel comfortable,and control more accurately

III. Technical Parameters

Picture	Type	Description	Heating Temp.	Speed/rpm	Max Stirred Volume	Plate Size/ Notes
	JOANLAB HS-12	Heating and stiring	Room temp.-300℃	0-1600rmp	1 L	120X120mm Aluminum panel
	JOANLAB HS-17	Heating and stiring	Room temp.-380℃	0-1600rmp	3 L	170X170mm Aluminum panel
	JOANLAB HS-19	Heating and stiring	Room temp.-380℃	0-1600rmp	5 L	190X190mm Aluminum panel with ceramic panel
	JOANLAB HSC-19T Digital display	Heating and stiring	Room temp.-350±10%	200-2000rmp	5 L	190X190mm Aluminum panel with ceramic panel

Preface

Thank you for purchasing our products: Hotplate / Magnetic Stirrer. Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

⏚	Connect the device to an earthed power supply to ensure safety of machine and experiment; connect the power as the machine required.
🚫	This equipment is forbid to use in inflammable and explosive, poisonous and strong corrosive experiments.
🚫	Make sure horizontal installation
⚠	Non-professionals are not allowed to disassemble and repair this machine.
🔥	Pay attention to the set temperature while dealing with the inflammable matters.
🔥	Make sure dry the resin container, if the temperature is setting too high by accident, the container would be dissolved and then fall on the heater to cause fire.
⚠	Overfilled of sample will lead to overheat of working room under parts, which will dissolve the inflammable material and cause fire.
🚫	While the machine is working, don’ t touch the top, window and exhaust port of the device to protect from high-temperature burns.
⚠	Read the instruction book before operation.

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- When working, ware the personal guard to avoid the risk from:

  - Splashing and evaporation of liquids
  - Release of toxic or combustible gases.

- Set up the instrument in a spacious area on an stable, clean, no n-slip, dry and fireproof surface, do not operate the instrument in explosive atmospheres, with hazardous substances or under water.

- Gradually increase the speed, reduce the speed if:

  - The stirring bar breakaway because of too high speed
  - The instrument is not running smoothly, or container moves on the base plate.

- Beware of hazards due to:

  -Flammable material or media with a low boiling temperature
  -Overfilling of media
  -Unsafe container

- Process pathogenic materials only in closed vessels.

- If the case of the stirrer bar is PTFE, plate note:

  Elemental fluorine, three fluoride and alkali metals will corrode the PTFE and Halogen alkenes make it expansion at room temperature Molten alkali, alkaline earth metals or their solution, as well as the power in second and third ethnic of the Periodic Table of elements will have chemical reaction with PTFE when temperature reaches 300 ~400 ℃

- Check the instrument and accessories before hand for damage each time you use them.

  Do not use damaged components. Safe operation is only guaranteed with the accessories described in the "Accessories" chapter. Accessories must be securely attached to the device and cannot come off by themselves. Always disconnect the plug before fitting accessories.

- Temperature must always be set to at least 25℃ lower than the fir point of the media used.

- Ensure that the external temperature sensor is i-nserted in the media to a depth of at least 20mm

- When using metal vessels, do not place the tem-perature sensors on the bottom of the vessel.

- When using metal vessels, do not place the tem-perature sensors on the bottom of the vessel.

  Placing sensors on the vessel bottom can cause excessively high temperature to be measured especially in media which have poor conductivity. The tip of the measuring sensor must be at least 5mm from the vessel bottom, a distance of 10mm is ideal.

- The instrument can only be disconnected from the main power supply by pulling out the mains plug or the connector plug.

- The voltage stated on the label must correspond to the main power supply.

- Ensure that the mains power supply cable does not touch the heating base plate. Do not cover the device.

- Keep away from high magnetic field.

- Observe the minimum distances between the devices, between the device and the wall and above the assembly (min.100mm).

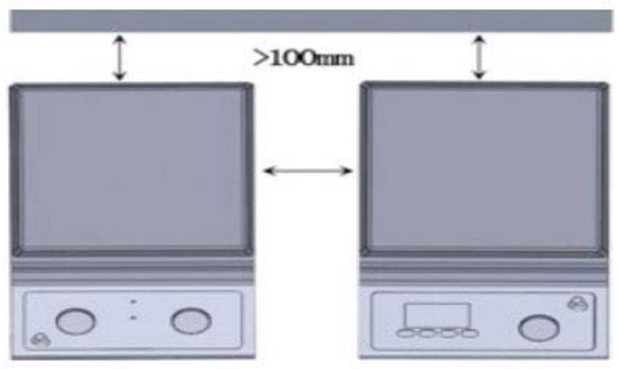


Figure 1

Proper Uses

The instrument is designed for mixing and / or heating liquids in schools, laboratories or factories. This device is not suitable for using in residential areas or other constraints mentioned in Chapter 1

Inspections

1. Receiving Inspection

Unpack the equipment carefully and check for any damages which may have arisen during transport. If it happens, please contact manufacturer for technical support.

Note:
If there is any apparent damage to the system, Please do not plug it into the power line.

2. Listing of Items

The packing includes the following items:

With Magnetic Stirrer			
Items	Qty	Items	Qty
Main unit	1	Rack with Rods	1
Power Cable	1	Fuse	1
Stirrer bar	1	Temperature sensor	1
User Manual	1		

Please check the instrument and appendix with the packing list when you first open the instrument packing case. If you find there is something wrong with the instrument and the appendix, do contact the vendor or the producer.

IV. Operating Modes

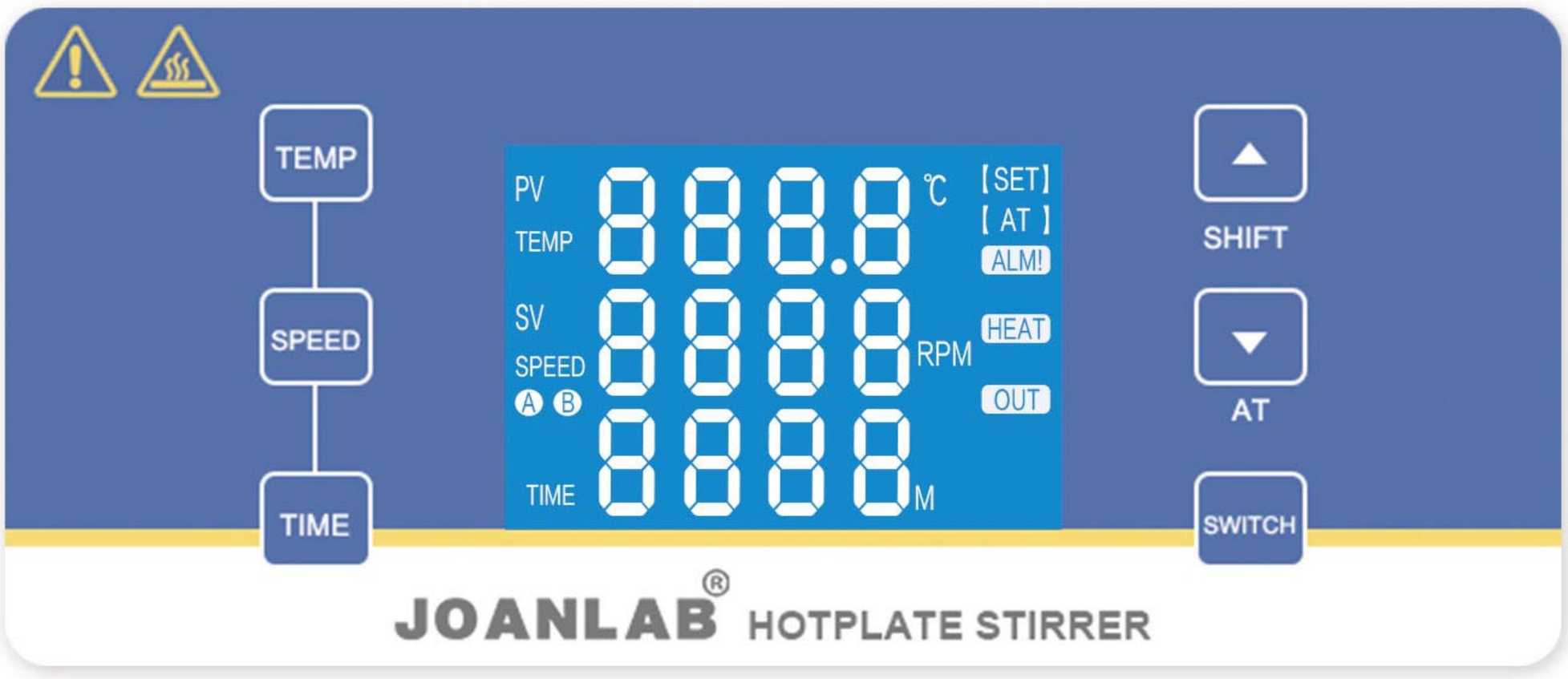
1. Magnetic stirrer with hot plate operation:

Place the equipment on level worktable, and then put the container with liquid one the hotplate.

Switch on the power accords with the machine, then power indicator light will be lighten; turn on the power of regulation knob, and turn the knob clockwise, then the working indicator light will be lighten; in the process of regulating, the light intensity changes according to different regulation position, and the temperature rises as well.

2.Digital type operation:

-- Panel indication



-- Definitions of button:

1. "TEMP" button: In the non-set state, click the button can set or view the temperature set point and its internal parameters.
2. "SPEED" button: In the non-set state, click the button can set or view the speed set point and its internal parameters.
3. "TIME" button: In the non-set state, click the button can set all-running time. End of the timer runs, click the button can restart the temperature control.

4. " ▲ /SHIFT" button: In the non-set state, long press this button for 3 seconds to switch between two channel temperature and automatically save. In the setting status, click the button to increase the set value. If press and hold the button, the set value will increase continuously.
5. " ▼ /AT" button: In the non-set state, long press this button for 6 seconds to enter temperature self-tuning selection state. In the setting state, click the button to reduce the set value. If press and hold the button, the set value will reduce continuously.
6. "SWITCH" button: Start or stop stirring.

-- Definitions of button:

1.When the controller is powered on, the up window of the controller shows the graduation and the instrument model(P2-C), the middle window of the controller show the versioning(FSv1), the controller will get into the normal view state after 3 seconds.

2. Temperature, Speed and Time Setting

In the non-set state, press the "TEMP" button, get into the temperature setting state. The display window show the temperature set value and flicker. Users can edit the temperature setting value by using the "▲/SHIFT", "▼/AT" buttons. Then press the "TEMP" button again. The controller will return to the normal view state, the setting value will be saved automatically.
The setting way of speed and time is same as of temperature.

3. Timing Function

Using the countdown timing, timing function has two modes can be choosed, operation timing or constant temperature timing. Time unit can choose hours or minutes. Buzzer time after timing end can be set, the detailed setting method can be found in the internal parameter table 1.

When the time is set to "0", it indicates the controller will run continuously.

When the time is over "0", if you choose the operation timing, the controller begins to time once powered on. If you choose constant temperature timing, the controller begins to time until the temperature reaches the set value. During the timing, the time window of controller displays the rest running time, the "TIME" indicator light flashes. Once the time period is over, the time window of controller display the "END" prompt, the speed window of controller display the "OFF" prompt, the buzzer will sound. At this time, the controller can be restart by resetting the timer time.

4. Stir (speed) Function

The controller is powered on, stir function is disabled, the middle window display "OFF". Click "SWITCH" button, enable stir function, the middle window display speed measurements, and click "SWITCH" button again, it will return to stop state.

5. Temperature Control Function

In the non-set state, long press this button for 3 seconds to switch between two channel temperature. When switching to the first temperature control, the prompt "Ⓐ" light, and switching to the second temperature control, the prompt "Ⓑ" light.

6. Over Temperature Alarm

When the temperature deviation on over temperature alarm occurs, buzzer beep sound call, " ALM!" character lit ,disconnect the heating output ,If the change of the temperature setting value and the alarm , the "ALM!" character lit ,but the buzzer does not call.

7. Abnormal alarm for temperature measurement

If the up window of the controller show the prompt "E-X", it indicates that the temperature sensor has some faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the heat-output automatically, the buzzer will sounds continuously, "**ALM!**" indicator light is lit on, Please check the temperature sensor and its wiring carefully.

E-1: indicates the first way temperature fault (PT100 thermal resistance);
E-2: indicates the second way temperature fault (K type thermocouple);
E-3: indicates the environment temperature fault.

8. Press any key to mute the buzzer tweet.

-- Auto-tuning of PID

Use auto-tuning function when the temperature control is not good. the temperature will have a greater impact during the Auto-tuning process, The users should understands this before using that function.

In the non-set state, press the "**▼/AT**" button for 6s, the controller will get into the pre-Auto-tuning state, the up window of the controller show the prompt "AT", the middle window of the controller show the values, user can press the "▲" or "▼" button to choose to show "0" of "1" prompt, when it shows the prompt "1", press the "TEMP" button, the controller will run the auto-tuning program, the "**AT**" light flashes, after auto-tuning end, the light stops flashing, parameter value is saved automatically. In the auto-tuning process, press the "**▼/AT**" button for another 6s, the controller will stop the auto-tuning program.

During the Auto-tuning process, if Over-temperature alarms, the buzzer does not beep, "**ALM!**" warning light is not lit, the Heat-Out will be cut off; the "**TEMP**" button is invalid.

-- Internal parameters settings

In the non-set state, Press the "**TEMP**" button for 3s, controller will display the password prompt "Lc". Adjust the password to the required value, then press the "**TEMP**" button again, it will run into the internal parameter setting state. If press the "**TEMP**" button for another 3s, it will return to the running state, the setting value will be saved automatically.

Parameter table -1

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
Lc	Password key	When Lc=3, enter the next parameters.	0
P	Proportional band	Adjustment of proportional function.	(0.1～300.0℃) 30.0
I	Integration time	Adjustment of integration function.	(1～1000s) 200
d	Differential time	Adjustment of differential function.	(0～1000s) 150
T	Control cycle	The temperature control cycle.	(1～60s) 5
doT1	Sensitivity of the first sensor	0: SP without a decimal point, 1: SP has a decimal point.	(0～1) 0

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
AH1	Over-temp alarm in the first sensor	When selecting the first channel sensor work. If "SV>(SP+AH1)", the "ALM!" light turns on. The buzzer sounds and the heating output turns off.	(0～100.0℃) 20.0
Pb1	Zero point adjust in the first sensor	When selecting the first channel sensor work. For error correction generated when the low temperature measurement.Pb1= actual value − measure value	(-50.0～50.0℃) 0.0
PL1	Full point adjust in the first sensor	When selecting the first channel sensor work. For error correction generated when the high temperature measurement.PL1=1000× (actual value − measure value) / measure value.	(-999～999) 0
SPH	Maximum set point	The maximum temperature set point.	(0～400.0℃) 400.0

Parameter table -2

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
Lc	Password key	When Lc=9, enter the next parameters.	0
FoP	Temp-pointof fan-on	If "Ambient temperature>FoP",fan start work.	(0～80℃) 40
FcP	Temp-pointof fan-off	If "Ambient temperature<FcP",fan stop work.	(0～80℃) 30
ndT	Timer mode	0: With timer function, the underwindow displays the running time when the measured temperature reaches to the setting value. 1: With timer function, the under window always displays the running time.	(0～1) 1
Hn	Timer unit	0: Minute; 1: Hour.	(0～1) 0
SPd	Constant temp Deviation	When SP >= (SV - SPd), the Controller get into the Constant-temp State.	(0.1～100.0℃) 0.5
EST	Timing Over Buzzer time	If the timing work is over, the Buzzer will beep for EST seconds.Note: if EST=9999, it means the buzzer will beep continuously.	(0～9999s) 5
PoT	"SWITCH"butto-n effective time	"SWITCH" button will be effective until the button is pressed continuously Pot seconds.	(0～10s) 0
AH2	Over-temp alarm in the second sensor	When selecting the second channel sensor work. If "SV>(SP+AH2)", the "ALM!" light turns on. The buzzer sounds and the heating output turns off.	(0～100℃) 20
Pb2	Zero point adjust in the second sensor	When selecting the second channel sensor work. For error correction generated when the low temperature measurement. Pb2 = actual value − measure value	(-50～50℃) 0
PL2	Full point adjust in the second sensor	When selecting the second channel sensor work. For error correction generated when the high temperature measurement.PL2 = 1000× (actual value − measure value) / measure value.	(-999～999) 0

Storage And Transportation

- Keep it in dry and clean room with good ventilation and no corrosive gas
- prevent it from wetting by the rain and avoid violent collision in transportation.

Parameter table -3

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
Lc	Password key	When Lc=27, enter the next parameters.	0
Fc	Temperature unit	0:Centigrade; 1:Fahrenheit.	(0～1) 0

Parameter table -4

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
Lc	Password key	When Lc=67, enter the next parameters.	0
rST	Reset to default values	0: cancelt to reset to default value; 1: confirm to reset to default value.	(0～1) 0

In the non-set state, Press the "SPEED" button for 3s, controller will display the password prompt "Lc". Adjust the password to the required value, then press the "SPEED" button again, it will run into the motor parameter setting state. If press the "SPEED" button for another 3s, it will return to the running state, the setting value will be saved automatically.

Parameter table -5

Parameter Prompt	Name	Instruction Of The Function	(Setting Range) Factory Set Value
Lc	Password key	When Lc=3, enter the next parameters.	0
Pd	Proportional band	Adjustment of proportional function.	(1～99) 40
Id	Integration time	Adjustment of integration function.	(1～99) 2
InT	Speed rise time	Time required when speed from minimum to maximum.	(5～60) 10
dET	Slow down time	Time required when speed from maximum to minimum.	(5～60) 10
SdL	Minimum set point	The minimum speed set point.	(60～SdH) 200
SdH	Maximum set point	The maximum speed set point.	((SdL～6000) 2000
PoL	Pole pairs	Motor pole pairs	(1～32) 1
db	False range	False speed display range.	(0～99) 5

V. Faults

● Instruments can' t be power ON

-- Check whether the power cable is plugged
-- Check whether the fuse is broken or loose

● Fault in power on self test

-- Switch OFF the unit, then switch ON and reset the instruments to factory default setting.